

## DISC STORAGE SYSTEM WITH ADAPTIVE PID CONTROL

### ABSTRACT OF THE DISCLOSURE

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A disc drive controller circuit for an actuator receives reference data indicating a desired actuator position " $\theta_d$ ", error data indicating a difference "e" between the desired actuator position and a sensed actuator position " $\theta$ ", and adaptive parameter data " $\hat{A}$ ". The controller  
10 circuit calculates a circuit output "u" that drives the actuator. The controller circuit derives the circuit output "u" according to a formula:

$$\hat{A} \left( \ddot{\theta}_d + 2\lambda \dot{e} + \lambda^2 e \right) + k \left( \dot{e} + 2\lambda e + \lambda^2 \int_0^t e d\tau \right)$$

in which " $\lambda$ " is a controller zero value and "k" is a controller gain value and "t" is time. The adaptive parameter  $\hat{A}$  is updated in general accordance with the formula:

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$$\hat{A}(k) = e_1 e_2 \Delta t + \hat{A}(k-1).$$